

Honors Chemistry Quiz: Chapters 5 & 15

Name: KEY Period: _____ Date: _____

This quiz is worth 46 points; each correct response is 2 points. Only those quizzes completed in black ink will be graded. Useful information: $R = 0.08206 \text{ L-atm/mol-K}$. Good luck!

1. A gas occupies 6.66 L at 4.46 atm. What is the volume at 5.00 atm?

- A) 5.94 L
B) 3.73 L
C) 2.97 L
D) 0.268 L
E) 18.6 L

A

2. A gas is at 15.0°C and 9.75 L. What is the temperature at 3.00 L?

- A) 343°C
B) 70.0°C
C) -184°C
D) 1.16°C
E) 17.5°C

C

3. What pressure will 14.0 g of O_2 exert in a 3.5 L container at 75°C ?

- A) 4.8 atm
B) 5.0 atm
C) 6.4 atm
D) 1.1 atm
E) 3.6 atm

E

4. How many molecules of CO_2 are contained in a 5.00 L tank at 4.85 atm and 485 K?

- A) 1.89×10^{24} molecules
B) 1.14×10^{24} molecules
C) 8.32×10^{24} molecules
D) 4.89×10^{24} molecules
E) 3.67×10^{23} molecules

E

5. Which of the following samples will have the highest pressure if they are all at the same temperature and in identical containers (same volume)?

- A) 15 g F_2
B) 15 g Ne
C) 15 g Kr
D) 15 g CO_2

B

E) All of these samples will have the same pressure.

6. Place the following gases in order of increasing density at STP.

N_2 NH_3 N_2O_4 Ar

- D
- A) $\text{N}_2\text{O}_4 < \text{Ar} < \text{N}_2 < \text{NH}_3$
 - B) $\text{Ar} < \text{N}_2\text{O}_4 < \text{N}_2 < \text{NH}_3$
 - C) $\text{N}_2 < \text{Ar} < \text{N}_2\text{O}_4 < \text{NH}_3$
 - D) $\text{NH}_3 < \text{N}_2 < \text{Ar} < \text{N}_2\text{O}_4$
 - E) $\text{Ar} < \text{N}_2 < \text{NH}_3 < \text{N}_2\text{O}_4$

7. Which of the following will cause the volume of an ideal gas to double in value?

- A
- A) Raising the temperature from 25°C to 323°C at constant pressure.
 - B) Lowering the absolute temperature by a factor of 3 at constant pressure.
 - C) Raising the absolute temperature by a factor of 3 while increasing the pressure by a factor of 3.
 - D) Lowering the absolute temperature by a factor of 3 while increasing the pressure by a factor of 3.
 - E) Lowering the pressure by a factor of 3 while the temperature stays constant.

8. Determine the density of NH_3 gas at 435 K and 1.00 atm.

- D
- A) 2.10 g/L
 - B) 0.477 g/L
 - C) 0.321 g/L
 - D) 0.954 g/L
 - E) 0.851 g/L

9. A mixture of 0.440 moles CO, 0.350 moles H_2 and 0.640 moles He has a total pressure of 2.95 atm. What is the pressure of CO?

- E
- A) 1.86 atm
 - B) 0.649 atm
 - C) 0.536 atm
 - D) 1.54 atm
 - E) 0.908 atm

10. A gas mixture contains CO, Ar and H_2 . What is the total pressure of the mixture, if the mole fraction of H_2 is 0.45 and the pressure of H_2 is 0.67 atm?

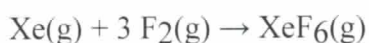
- B
- A) 1.9 atm
 - B) 1.5 atm
 - C) 0.49 atm
 - D) 0.60 atm
 - E) 2.1 atm

11. A syringe contains 589 mL of CO at STP and a second syringe contains 473 mL of N₂ at STP. What is the final pressure if the contents of these two syringes are injected into a 5.00 L container at 25°C?

- A) 0.232 atm
B) 1.1 atm
C) 1.7 atm
D) 1.9 atm
E) 3.8 atm

A

12. How many molecules of XeF₆ are formed from 12.9 L of F₂ (at 298 K and 1.30 atm) according to the following reaction? Assume that there is excess Xe.



- A) 1.21×10^{23} molecules XeF₆
B) 8.25×10^{23} molecules XeF₆
C) 2.75×10^{23} molecules XeF₆
D) 4.13×10^{23} molecules XeF₆
E) 1.37×10^{23} molecules XeF₆

D

13. Identify the gas particle that travels the fastest.

- A) H₂
B) O₂
C) Ne
D) N₂
E) CO

A

14. Give the characteristics of a strong acid.

- A) ionizes completely in aqueous solutions
B) has a very electronegative atom attached to the oxygen
C) has a polar bond
D) has a weaker bond to hydrogen
E) all of the above

E

15. The stronger the base, then which of the following is TRUE?

- A) The stronger the conjugate acid.
B) The stronger the conjugate base.
C) The weaker the conjugate base.
D) The weaker the conjugate acid.
E) None of the above.

D

16. What is the concentration of hydroxide ions in pure water at 30.0°C, if K_W at this temperature is 2.16×10^{-14} ?

- C
- A) 1.00×10^{-7} M
 - B) 1.30×10^{-7} M
 - C) 1.47×10^{-7} M
 - D) 8.93×10^{-8} M
 - E) 1.21×10^{-7} M

17. Calculate the pOH of a solution that contains 2.04×10^{-11} M H_3O^+ at 25°C.

- B
- A) 4.59
 - B) 3.31
 - C) 10.59
 - D) 9.14
 - E) 0.59

18. Which of the following acids is the WEAKEST? The acid is followed by its K_a value.

- B
- A) $HC_2H_3O_2$, 1.8×10^{-5}
 - B) HIO , 2.3×10^{-11}
 - C) $HBrO$, 2.3×10^{-9}
 - D) $HClO$, 2.9×10^{-8}
 - E) $C_6H_5CO_2H$, 6.3×10^{-5}

19. Which of the following is a STRONG base?

- E
- A) Cl^-
 - B) NH_3
 - C) CH_3OH
 - D) NO_3^-
 - E) KOH

20. Determine the pH of a 0.116 M H_2SO_4 solution at 25°C.

- D
- A) 8.62
 - B) 13.06
 - C) 13.37
 - D) 0.63
 - E) 12.56

21. Determine the pH of a 0.275 M NH_3 solution at 25°C . The K_b of NH_3 is 1.76×10^{-5} .

- A) 5.480
B) 2.740
C) 8.520
D) 11.340
E) 12.656

D

22. Determine the $[\text{OH}^-]$ concentration in a 0.0235 M NaOH solution.

- A) 4.25×10^{-14} M
B) 0.0235 M
C) 2.13×10^{-14} M
D) 0.198 M
E) 0.235 M

B

23. Determine the K_b of the conjugate base of an acid whose 0.294 M solution has a pH of 2.80.

- A) 1.2×10^{-9}
B) 8.5×10^{-6}
C) 2.7
D) 4.9×10^{-7}
E) 5.4×10^{-3}

A